

SECTION 2 – INSTALLATION

SECTION 2 - METALLURGY

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PART 1— SITE CONSIDERATIONS

PART 1 -- SITE OPERATIONS

It is not envisaged that very much site preparation will normally be required; possibly none at all for simple configurations. However, although the computers discussed are small in size, their potentialities are such that they may well form the basis of an extensive data processing or real time application for which some of the site information given in this chapter would require consideration. The customer is advised to consult the Philips representative regarding site preparation and any subsequent problems in order to ensure that the necessary facilities are ready when the system is delivered.

The efficient use of a large data processing system depends a great deal upon the layout of the equipment. Four main activities require consideration, viz, operation, work flow, maintenance and media storage. Also to be borne in mind is the possibility of future expansion and, if this is likely, extra space should be allocated to avoid the difficult and costly task of enlarging the site at a later date.

Operation

Adequate working space must be allowed for the operators within the limitations imposed by the interconnecting cables (see Table 2.2 Chap.2) Machines which generate dust, noise or vibration, such as line printers and card punches, must be kept apart from magnetic tape and disc units; if necessary a separate card punching room should be provided.

Work Flow

Work flow is a major consideration in a data processing installation and care must be taken to ensure that incoming and outgoing data are separated. It is usual to define three separate areas: data reception, central processing, and output collation.

In real time applications communication with the central processor is mainly via interconnecting equipment, such as MIOS, obviating the need for discrete input and output areas and so preventing human errors.

Storage

Space should be assigned in the computer room for the storage of commonly used media like magnetic tape and discs or materials such as printer forms and blank paper tape; a separate fireproof vault should be provided for the long term storage of important items. The environmental conditions relating to storage are specified in Chapter 3. Magnetic tapes and disc packs must be kept in dustproof containers and stored away from sources of magnetism. Shocks and vibrations must be avoided.

Mains Supplies

A single phase supply complying with the requirements specified below should be provided for the exclusive use of the computer system. The current carrying capacity of the supply circuit must be adequate to meet the total power consumption, derived from Table 2.1., with sufficient in reserve for expected future developments.

System 3 wire: single phase, neutral and earth or two phases and earth.

Voltage 115V or 220V r.m.s. $\pm 10\%$

Note: These are the standard alternative mains voltage levels for the central processor and peripherals. The equipment can also be supplied to suit other levels, e.g. 240 Volts in the U.K. Further details about mains conversion can be found in Part 2 and Part 3 of this section.

Frequency 48 to 63 Hz

Note: The peripheral equipments are supplied to work with a mains frequency of 50 Hz. They can be supplied to work with 60 Hz only if this frequency is specified at the time of ordering.

Voltage transients 1.5kV peak amplitude for a duration not exceeding 10 microseconds between half peak points at a repetition frequency of 3 to 10 Hz for not more than 10 minutes.

Transient state The time between the voltage falling from nominal to zero and then returning to nominal must be not greater than 0.5 seconds.

Power interrupts Not more often than one every 10 seconds for a duration not exceeding 10 ms.

Table 2.1. General Summary

Type	Unit Description	Operational Environment				Dissipation kcal/h	Power consumption kVA	Physical Characteristics								Weight kg	Floor Loading kg/m ²	Remarks
		Temperature		Humidity				Overall Dimensions			Access Clearance							
		Min °C	Max °C	Min %/rh	Max %/rh			Height mm	Width mm	Depth mm	Front mm	Rear mm	Right mm	Left mm				
P852N/P856M-100	Chassis-rack mounted	0	+45	0	90	300	0.4	133	—	—	RACK	(3 Units)	—	—	17	RACK	1 rack unit = 44.45 mm for all basic mounting boxes. Atmospheric pressure to be at least 700mb during operational use	
P852N-200	Chassis-rack mounted	—	—	—	—	300	0.4	133	—	—	RACK	(3 Units)	—	—	17	RACK		
P852N/P856M/P857-400	Chassis-rack mounted	—	—	—	—	600	0.6	266	—	—	RACK	(6 Units)	—	—	—	RACK		
P857M-500	Chassis-rack mounted	—	—	—	—	1100	1.5	488	—	—	RACK	(11 Units)	—	—	—	RACK		
P843-001	Equipment Shelf	—	—	—	—	(a)	(a)	133	—	—	RACK	(3 Units)	—	—	(a)	RACK		
P843-002	Equipment Shelf	—	—	—	—	(b)	(b)	222	—	—	RACK	(5 Units)	—	—	(b)	RACK		
P843-003	Equipment Shelf	—	—	—	—	(c)	(c)	222	—	—	RACK	(5 Units)	—	—	(c)	RACK		
P801-001	Punched Tape Reader	0	+45	20	85	100	0.15	133	—	(d)	RACK	(3 Units)	—	—	15	RACK	(a) Holds up to 6 I/O cards type 1	
P803-001	Tape Punch 75ch/s	0	+45	20	85	140	0.2	(e)190	220	432	1000	—	—	13	139	(b) Holds up to 8 I/O cards type 2		
P806-102	Card Reader *	+15	+25	50	70	485	(f)0.65	413	585	460	1000	1000	25	25	35	(k)	(c) Holds up to 8 I/O cards type 2	
P809-002	Line Printer	+10	+40	20	80	230	0.3	800	700	460	1000	1000	25	25	80	222	(d) Protrudes 58mm	
P811-001	Line Printer	+10	+43	(g)30	80	430	0.55	1170	1232	625	600	400	25	625	272	355	(e) Rack version height 267mm	
P812-001	Line Printer	+10	+43	(g)30	90	1030	1.4	1170	1232	625	600	400	25	625	362	470	(f) 6 Units	
P810-001/002	Display Terminal	+10	+40	10	90	150	0.2	292	381	500	1000	1000	25	25	17.4	(k)	(f) 1.425 KVA when starting	
P824-002	Moving Head Disc	+16	+35	8	80	370	0.5	267	—	(h)	RACK	(6 Units)	—	—	66	RACK	(g) 10% if static eliminator is fitted	
P825-007	Moving Head Disc	+16	+32	20	80	2390	0.75	864	483(o)	864	1000	368	482	25	100	RACK	(h) Projects 500mm during loading	
P831-002/004/006	Tape Transport	+15	+32	15	95	230	0.3	622	—	(j)	RACK	(14 Units)	—	—	39	RACK	(i) Protrudes 75mm	
P831-010/020/030	Tape Formatter	+2	+50	10	95	70	0.1	89	—	—	RACK	(2 Units)	—	—	11	RACK	(j) Table top model	
P833-001	Cassette Tape Unit	0	+50	5	95	30	0.04	(k)159	123	280	1000	—	—	—	(k)3.5	(k)	(k) Table top model	
P833-152	Chassis for 3 x P833-001	0	+50	5	95	70	0.11	178	—	—	RACK	(4 Units)	—	—	18	RACK	(l) 310mm without keyboard (oc3 (003+004)	
P841-101/105	I/O Typewriter ASR33	0	+45	20	85	220	0.3	1140	560	470	1000	750	25	25	25	90	(m) Max. Modules per frame = 16	
P842-001 to 004	Character Printer	+10	+40	20	80	120	0.15	175	513(1)	465	—	—	—	—	12	(k)	(n) or 12 + power supply	
PC 1800	MIOS Module Frame **	+5	+45	40	85	(1)	(1)	178	—	—	RACK	(4 Units)	—	—	(m)	RACK	(n) Gross weight kg/m ² 0.45	
P849-016	36 Unit Rack and Cabinet	—	—	—	—	—	—	1717	585	770	1200	1200	—	—	96	(n)	(o) Projects 457mm during loading	
															empty			

* Environmental conditions quoted are those imposed
by the media

** Supplied by S&I

Alternative Supplies

If mains failures are likely to cause disastrous or frequent interruptions to system operation, it may be advisable to install a standby supply source. This can be a manually or automatically started diesel generator set, with an inherent time lag, or one of several combinations of a storage battery with either a rotary motor/generator or a solid state rectifier/inverter which are almost instantaneous in providing emergency power.

However, where incompatibility with the system requirements is the problem and not power failure, then it merely becomes necessary to process the supply. Mains filters and magnetic stabilizers may suffice or it may be necessary to drive a suitable generator by a motor connected to the mains. A diesel generator set as the normal supply source also provides a solution, particularly where the unsuitability of the mains is accompanied by the likelihood of frequent breakdowns.

Interconnection Cables

Two kinds of electrical cable interconnections are used in the computer system - the cables separately conveying a.c. power to the various devices and the inter-unit signal transmission cables. Both cables are delivered with the equipment with the power cables terminating in versatile plugs which fit most types of mains outlet socket in use on the European continent - see Appendix for colour coding and plug details.

The maximum permissible lengths for the signal transmission cables between the control unit cards and the peripheral devices are given in Table 2.2. Where the shorter lengths specified give rise

to layout problems it may be necessary to house the control units cards concerned close to the peripherals instead of in the central processor basic mounting box.

Table 2.2. Peripheral to Control Unit Signal Cables

Peripheral Units	Length(m)*	
	Standard	maximum
P801-001 Punched Tape Reader - Digitronics 2540	3	15
P802-001 Punched Tape Reader - Digitronics 2540	3	15
P803-001 Tape Punch - Facit 4070	3	15
P806-102 Card Reader - Documation M300	7.5	7.5
P809-002 Line Printer - Philips PER1415	5	5
P811-001 Line Printer - Data Products 2420	7.5	15
P812-001 Line Printer - Data Products 2440	7.5	15
P824-002 Moving Head Disc - Philips PER1215	7.5	15
P825-007 Moving Head Disc - Control Data Corp.9760		
P831-010 Mag. Tape Formatter - PERTEC 25/45/37.5 /020/030 i.p.s.	1.5	3
P833-001 Cassette Tape Unit - Philips ELA	1	1.5
P841-101 Teletypewriters - ASR33 /105	7.5	15
P842-001 Character Printers - Philips PER3100 to 004	7.5	15
P818-001 Display Terminal - Hazeltine 1200 /002 (Philips Type A)	15	30
PC1800 - MIOS Modules	3	3
P837 - DIOS Controllers	dependent upon user devices	

*Note that this is the overall length between the end connectors so that when planning the physical layout allowance must be made for internal cable routing.

Structure

Floors and Ceilings

A floor able to support a static loading of 500kg/m^2 is strong enough for any minicomputer system but half this value will suffice for many arrangements involving only the smaller units - see Table 2.1.

Besides enhancing the acoustic properties, the fitting of a false ceiling in the computer room conceals the air ducting, fire protection devices and lighting system. Moreover, if the false ceiling is composed of removable tile, light fittings can easily be repositioned to suit changing requirements; also, if the tiles are of the perforated type, the ventilation can be adjusted by controlling the number of unblocked holes.

The ceiling must be constructed of materials that do not generate dust and a recommended height from the floor surface is 2.8 metre; this height is not, however, mandatory.

Safety Precautions

Local regulations and conditions of insurance will determine the precise nature of fire and safety precautions; the information given here is for general guidance.

Non-combustible or fire resistant materials should be used for walls, floors, ceilings, acoustic surfaces and furniture. Where data reception and output areas are likely to contain large quantities of combustible material, they should be separated from the central processing area by floor-to-ceiling walls and self closing doors that are fireproof.

All cleaning materials and fluids should be kept enclosed in metal cabinets outside the computer room and waste paper should not be allowed to accumulate for any length of time. Records which have to be stored in the processing area for operational reasons must be kept to a minimum and housed in a fireproof safe.

Automatic sensing and warning systems are widely used in large installations; in these systems, thermal or ionization sensors can trigger alarms, switch off power and operate sprinklers should a fire occur. Where the computer is engaged in supervising industrial processes, however, automatic shutdown may lead to widespread damage; in these circumstances manual procedures are advisable.

Air Conditioning - Computer Room

High temperatures are harmful to sensitive electronic components; excessive humidity causes the handling properties of paper materials to deteriorate, e.g. punched cards curl and become unmanageable; large dust particles have an abrasive effect upon magnetic tape and discs.

The following conditions are normally adhered to in computer rooms to prevent deterioration of I/O media and machine performance while providing a suitable atmosphere for the operating personnel. In general, the tolerances quoted are well within those specified elsewhere for the individual items of equipment but although a sharp fall in temperature would not therefore result in thermal damage to the equipment, provided the rate of change was not too swift, the consequent increase in relative humidity and resultant condensation would be harmful.

Operating conditions

temperature	+18°C to +24°C	(15°C to 30°C also permissible)
relative humidity	50% to 60%	(up to 70% also permissible)
air pressure *	860 to 1060	millibars.

* It is usual to maintain the air pressure in the computer room above that of the outside atmosphere to prevent the ingress of external air.

Non-operating conditions:

When the system is not in use, and I/O materials have been removed, the following levels are satisfactory provided care is taken to ensure

condensation does not occur, especially when starting the air conditioning system.

temperature	+10% to +32°C
relative humidity	20% to 80%

Air Conditioning - Media Storage

Media needing to be readily available must be kept in environmental conditions identical to those existing in the computer room including, where magnetic tape reels and disc packs are concerned, 90% filtration of dust particles exceeding 3 microns unless these items are sealed in containers when being unloaded from the parent machine.

The long term storage conditions for the two classes of media are stated below; the manufacturers recommendations should be observed, however, if the storage period is likely to exceed one year.

Magnetic Materials

temperature	+10°C to +32°C
relative humidity	20% to 80%
max. wet bulb temp.	26°C
filtering	90% of particles exceeding 3 microns
magnetic field	not greater than 5.5 A/mm

Card and paper materials

temperature	+10°C to +32°C
relative humidity	30% to 65%

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